

Applicants appreciate the Examiner pointing out that the claims submitted as Claims 25-28 in the amendment of March 15, 1999, were misnumbered. Following the Examiner's amendment, these claims will be referred to as Claims 32-35.

Claims 18-23 and 35 have been amended to correct problems with antecedent basis.

Claim 34 has been amended to change the term "radiation sensors" to "micromechanical sensors." Support for use of the term "micromechanical sensors," of which a microcantilever is one species, is found in the specification at, among other locations, p. 1, line 12, and p. 6, line 10.

New Claims 36-53 recite imaging devices or a method of imaging in which a plurality of micromechanical sensors are formed on a single chip. Support for these claims is found at, among other locations, pp. 12 and 31 and FIGS. 3 and 4 of the specification. In particular, page 12 of the present specification recites:

"As shown in Figs. 3. and 4., these infrared detectors can be manufactured on a single wafer 28 in a two dimensional array 30 of five-hundred or more microcantilevers 32. This arrangement provides spatial resolution comparable to current CCD detectors."

Figures 3. and 4. illustrate plan and sectional *views* "of a wafer containing an array of microcantilevers."

Page 31 of the present specification recites that:

"With current micro-manufacturing technologies, an entire sensor embodiment is able to fit in a volume less than 100 μm on a side. A sensor array and control electronics can be housed in a standard transistor package."

All of the claims remaining in the application are directed toward the use of microcantilevers arranged in a two-dimensional array for imaging purposes.

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The Examiner has rejected Claims 18-23 and 35 under 35 U.S.C. §112, second paragraph, because of problems with antecedent basis. More particularly, where Claim 34 (the independent claim from which each of Claims 18-23 and 35 directly or indirectly depends) recites a plurality of sensors, Claims 18-23 and 35 recited only a sensor. The antecedent basis problems have been corrected, and the rejections are thus believed overcome.

The Examiner has rejected Claim 34 under 35 U.S.C. §112, first paragraph, as being based upon a non-enabling disclosure. To the extent that the Examiner's rejection can be understood, the rejection is believed overcome by the foregoing amendments to Claim 34. Applicants do not understand the phrase "...not included in the claim is not enabled by the disclosure." Applicants assume the Examiner means that the phrase "radiation sensors" in Claim 34 is broader than the term "microcantilevers," and that no radiation sensor other than a microcantilever is disclosed in the specification. If this is indeed the basis for the Examiner's rejection, then the amendments to Claim 34 changing "radiation sensors" to --micromechanical sensors-- is believed to overcome the rejection. If this is not the basis for the Examiner's rejection, applicants would appreciate some elaboration on what the Examiner means by the phrase "...not included in the claim is not enabled by the disclosure."

On page 5 of the Office Action of March 30, 1999, the Examiner further comments on Claim 34: "{T}here is not sufficient detail in the specification to support a claim drawn to imaging." Applicants construe the Examiner's comments as another basis for rejecting Claim 34 under 35 U.S.C. §112, first paragraph, as being based upon a non-enabling disclosure. To the extent that this is the case, the Examiner's rejection is respectfully traversed. Imaging is discussed as a possible use of a microcantilever array

at a number of places in the specification, including among other locations, pp. 7, 12, and 31. Specifically, p. 7 of the specification recites that:

"A micromechanical sensor assembly comprising an array of coated microcantilevers provides detection resolution comparable to CCD arrays."

Page 12 of the present specification recites that:

"As shown in Figs. 3. and 4., these infrared detectors can be manufactured on a single wafer 28 in a two dimensional array 30 of five-hundred or more microcantilevers 32. This arrangement provides spatial resolution comparable to current CCD detectors."

Further, page 31 continues:

"Other applications of the invention include infrared radiation detection, satellite imagery, aerial surveillance, night vision, collision avoidance..."

"CCD detectors," as mentioned above, are standard videographic imaging devices. The inventors' use of such terminology, along with discussion of various imaging and surveillance applications, makes it clear that the specification discloses the use of a two-dimensional array of micromechanical sensors for various imaging applications.

If it is the Examiner's assertion that applicants have disclosed that a microcantilever array can be used for imaging but have not disclosed *how* the device can be used for imaging, then that rejection also is traversed. A specification need only be enabling to a person of ordinary skill in the art. A person of ordinary skill in the art will already be aware of the use of CCD detectors for imaging purposes and the manner in which output signals from CCD detectors can be processed to create images. Based upon this understanding, taking the output signals from a two-dimensional array of micromechanical sensors and processing the signals to create images would be well within the ordinary level of skill in the art.

The Examiner has rejected Claims 18-23, 34, and 35 as being unpatentable over *Barnes* (NATURE, vol. 372, 11/3/94, p. 79) in view of *Halsor* (U.S. Patent No. 3,896,309). According to the Examiner, *Halsor* teaches the use of radiation detectors arranged in an array. The Examiner's rejection is respectfully traversed. First, as stated at length in applicants' previous submissions, applicants disagree that *Barnes* teaches what the Examiner contends it teaches. Even accepting the Examiner's interpretation of *Barnes* for the sake of argument, however, neither *Barnes* nor *Halsor* teaches or suggests the use of micromechanical sensors for imaging purposes. *Barnes* is silent as to the use of micromechanical sensors arranged in a two-dimensional array. *Halsor* teaches only that multiple infrared "detectors can be connected in arrays, such that a radiation pattern over an area can be determined." Description of readout means is limited to semiconductor means. It is unclear from the specification of *Halsor* how connection of multiple detectors is envisioned. Further, as relates to Claims 36-53, no disclosure is provided for fabrication and connection of such detector arrays on a single wafer.

Moreover, these examples of prior art further support the applicants' assertion that the present invention is not obvious. Despite some of these references having been available for over twenty-five years, and despite the significant advantages which can be derived from the use of a two-dimensional array of micromechanical sensors for imaging purposes, no one has combined the teachings of these references to create an imaging apparatus. Specifically, disposal of a multiplicity of micromechanical sensor elements in a two dimensional array on a single wafer does not have precedence, either as a matter of fact or of speculation by those skilled in the art.

A request for a two-month extension of time within which to file a response, together with the requisite fee, is enclosed.

A supplemental Information Disclosure Statement, together with a fee for late filing of an IDS, also accompanies this response.

For the reasons set forth above, the present application is believed to be in condition for allowance. Reexamination and reconsideration of the application are requested, and allowance of the claims at an early date is courteously solicited.

Respectfully submitted:

A handwritten signature in black ink, appearing to read "Larry A. Roberts", written in a cursive style.

Larry A. Roberts
Reg. No. 31,871

JONES & ASKEW
2400 Monarch Tower
3424 Peachtree Road NE
Atlanta, Georgia 30326
(404) 949-2400

Attorney's Docket No. 12610-0190